

A1
preferred filter membrane layer 16a is a PTFE membrane which is made microporous by stretching (typically biaxially) a PTFE film to create micropores therein. PTFE membranes that may be used are available commercially with a range of properties, such as pore diameter, thickness, engineering properties and the like. One particularly preferred PTFE membrane that may be employed in the practice of the present invention is available commercially from W.L. Gore & Co., Inc., under the registered trademark GORETEX®.

IN THE CLAIMS

Please further amend the remaining pending claims herein as follows:²

A2
1. (Amended) A filter cartridge having a multilayer pleated filter media comprised of a filter membrane layer, and at least one support layer for the filter membrane layer, wherein said at least one support layer is an expanded polymeric film mesh, wherein pleats of the multilayer pleated filter media have elongate pleat axes disposed substantially parallel to a central longitudinal axis of the filter cartridge, and wherein said expanded polymeric film mesh is formed of a dense plurality of generally diamond-shaped apertures having respective long and short dimensions; and wherein said expanded polymeric film mesh is disposed such that said long dimensions of said diamond-shaped apertures thereof are oriented substantially transverse to said elongate pleat axes of the pleated filter media.

A3
7. (Amended) A filter cartridge comprising:
concentrically disposed slotted core and cage members, and

² Pursuant to Rule 121(c), a marked-up version of the amended claims appears in Appendix II hereto and shows all changes by underlining added language and bracketing deleted language.

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a multilayer pleated filter media positioned in an annular space established between said core and cage members, wherein said filter media includes an inner filter membrane layer sandwiched between a pair of support layers for the filter membrane layer, wherein each said support layer is an expanded polymeric film mesh, and wherein pleats of the multilayer pleated filter media have elongate pleat axes disposed substantially parallel to a central longitudinal axis of the filter cartridge, and wherein said expanded polymeric film mesh is formed of a dense plurality of generally diamond-shaped apertures having respective long and short dimensions; and wherein said expanded polymeric film mesh is disposed such that said long dimensions of said diamond-shaped apertures thereof are oriented substantially transverse to said elongate pleat axes of the pleated filter media.

Please cancel claim 12.

13. (Amended) The filter cartridge of claim 1 or 7, wherein said filter media includes a pair of said support layers which sandwich said filter membrane layer therebetween.

14. (Amended) The filter cartridge of claim 1 or 7, wherein each of said filter membrane layer and said expanded polymeric film consists of polytetrafluoroethylene.

15. (Amended) The filter cartridge of claim 1 or 7, wherein said expanded polymeric film exhibits an open area of at least about 40%.

REMARKS

Reconsideration and allowance of this application are solicited.

By way of the amendment instructions above, a minor typographical error has been corrected in the specification.

Claims 1 and 7 have also been amended so as to include therein the subject matter of claim 12. As such claim 12 has been cancelled and the claim dependencies of claims 13-15 changed accordingly. As such, claims 1-11 and 13-20 remain pending herein for which favorable reconsideration is requested.

I. Response to Claim Objections

The Examiner's informality objections advanced against claims 4-6 are not fully understood. Specifically, claims 4-6 are not themselves multiply dependent, but instead are singularly dependent from a multiply dependent claim. As such, claims 4-6 are entirely proper multiple dependent claims and therefore must be examined on their merits.³

II. Response to 35 USC §112, Second Paragraph Claim Rejections

The Examiner also seems to be of the position that the term "about" automatically renders claims indefinite within the meaning of 35 USC §112, second paragraph. Applicants note, however, that such terms of degree do not in and of themselves render a claim indefinite within the purview of 35 USC §112, second paragraph.⁴ This is particularly true where, like here, an ordinarily skilled person would have no difficulty understanding the limitation. Accordingly, withdrawal of the rejections under 35 USC §112, second paragraph due to the presence of the term "about" is in order.

III. Response to Art-Based Claims Rejections

With the exception of claims 4-6 (which for the reasons noted above should have received some action on the merits), all claims pending in this application attracted a

³ It is noted also that, since claims 4-6 were proper as originally filed, any further action on the merits, if needed, must be non-final.

⁴ *Seattle Box Co. v. Industrial Crat. & Pack., Inc.* 221 USPQ 568 (Fed. Cir. (1984); *In re Marosi*, 218 USPQ 289 (Fed. Cir. 1983).

rejection under 35 USC §103(a). More specifically, claims 1-3, 7-8, 12-13 and 16-17 have been rejected under 35 USC §103(a) as allegedly being "obvious" from the combination of Miller et al (USP 5,252,207) in view of Dunn et al (USP 4,664,684). Each of Foo (USP 5,700,304) and Ashelin et al (USP 5,154,827) has been combined with Miller et al and Dunn et al to separately reject claims 9-10, 15 and 20 on the one hand, and claims 11, 14 and 18-19 on the other hand, respectively. Applicant suggests that none of the applied publications are appropriate as a reference against the claims pending herein.

Applicant notes that the present invention is novel in several respects. In this regard, the invention is embodied, *inter alia*, in filter cartridges having a multilayer pleated filter media comprised of a filter membrane layer, and at least one support layer for the filter membrane layer, wherein said at least one support layer is an expanded polymeric film mesh. The pleats of the multilayer pleated filter media have elongate pleat axes disposed substantially parallel to a central longitudinal axis of the filter cartridge, and the expanded polymeric film mesh is formed of a dense plurality of generally diamond-shaped apertures having respective long and short dimensions.

What should not be lightly overlooked when reviewing the patentability of this application is that the expanded polymeric film mesh is disposed such that ***the long dimensions of the diamond-shaped apertures are oriented substantially transverse to said elongate pleat axes of the pleated filter media***. As described in the originally filed specification, such a novel orientation of the apertures achieves a surprising increase in flow rates.

The Examiner is asked to again review the data presented in Table 1 of the application. As can be seen, the data in Table 1 show that the orientation of the long dimensions (LD) of the diamond-shaped apertures of the Type 2 PTFE support mesh in accordance with the present resulted in substantially higher – i.e., a nearly four-fold increase – in flow rate characteristics as compared to both the non-woven PTFE and the Type 1 PTFE support structures. Thus, with the present invention, the data of Table 1 show that the flow rate increased from 0.84 gpm/psi to 3.20 gpm/psi by virtue of

reorientation of the diamond shaped apertures of the expanded mesh so that the long dimension thereof is oriented transverse to the pleat axes.

Turning attention to the applied references of record, it appears that the Examiner considers Dunn et al to disclose that the orientation of the relative long dimension of the diamond-shaped apertures to be transverse to the pleat folds and, as such, one could obviously provide such a mesh support structure in the pleated filter media of Miller et al. Applicant emphatically disagrees.

At the outset, applicant notes that none of the art of record – including Dunn et al – provides any suggestion at all to those in the art that substantial improvements in flow rate characteristics would or could ensue by orienting the long dimension of diamond-shaped apertures in a pleated filter medium so as to be transverse to the pleat axes. Thus, any statements to the contrary must necessarily have originated with the present applicant's disclosure which, of course, is clearly erroneous when reviewing issues under 35 USC §103(a).

Notwithstanding the total *lack* of suggestion in Dunn et al regarding the particular orientation of the diamond-shaped apertures in the manner as claimed herein, Dunn et al explicitly teaches away from the present invention. That is, a careful reading of Dunn et al reveals that, in reality, the orientation of the diamond-shaped apertures is **opposite** to that claimed herein – i.e., such that the elongate dimension of the diamond-shaped apertures is oriented **parallel** to the pleat axes. As such, the combination of Miller et al and Dunn et al would thus not result in the present invention.

That the orientation of the diamond-shaped apertures is parallel to the pleat axes in Dunn et al can be discerned from the disclosure appearing at column 2, lines 13-22 wherein it is noted that:

“...one elongated burr-forming peripheral edge portion of the blank is folded back upon itself so as to form a hem-like segment 16. Subsequent to the hem-like segment 16 being formed, the segment and the burr-forming peripheral edge